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**PEPPER CULTIVATION
ON THE WEST COAST**



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The word "Pepper" is derived from a Latin word "Piper," which is from a Greek word "Peperi" which is in its turn derived from a Sanskrit word "Pippali" meaning long pepper (*Piper longum*). The origin of the word itself throws some light on the route that pepper took to the West.

Medical Science is supposed to have been imported from India to Europe by the Greeks; as *Piper longum* is a remedy of repute for phlegmatic affections, and as the European climes are more or less phlegmatic, pepper might have been introduced into the West via Greece and Italy.

The pepper family consists of several members, e.g., Black pepper (*Piper nigrum*), Long pepper (*Piper longum*), Betel pepper (*Piper betel*), etc., of which the black is the most important and the subject of this paper.

The berries of the *Piper nigrum* are the black and white pepper of commerce. It is a perennial plant with a creeping or climbing stem, of a dark colour, which soon becomes ligneous and acquires considerable thickness. It was supposed in the early days that white pepper was produced from a plant different from that which produced the black.

History—That pepper is an indigenous product of India is seen from the above origin of the word itself. It is mentioned in the Hindu medical works, such as Charaka and Susrutha, which are supposed to be dated several centuries before the birth of Christ. Pepper plant, being indigenous to Malabar Coast, was first cultivated and exported thence, and that in very early times. From this region it gradually spread over other parts of India, but at what dates is not clear. From the earliest recorded times till the fifteenth century at least the greater part of the spice in the markets of the world was derived from the West Coast of India. The whole of this region from Cape Comorin to Kanara was the pepper country for many centuries, producing not only the greatest amount, but also the spice of the highest reputation.

The trade in pepper is perhaps the oldest and during the middle ages was certainly much the most important branch of commerce between Europe and India. Pepper is one of the earliest known spices in the world.

It is first mentioned by Theophrastus in the fourth century B.C. White pepper is mentioned first by Dicseorides. It is stated by Arrian in 618 A.D. that pepper was then imported from Barake, the shipping place of Nelkunda, localities which have been identified with points on the Malabar Coast. In the siege of Rome by Alaric, King of the Goths, the ransom demanded included 3,000 lb. of pepper. After the conquest of Cæsarea in 1101 A.D. by the Genoese, each soldier received two pounds of pepper as part of his booty. Pepper rents were also not uncommon then.

The first mention of pepper in England is in the statutes of Ethelred (978 A.D.—1016 A.D.) where it is enacted that traders should pay at Christmas and Easter, with other tribute, ten pounds of pepper.

During the middle ages it was the most esteemed and important of all spices, indeed it formed "the very symbol of the spice trade, to which Venice, Genoa, and the commercial cities of Central Europe

were indebted for a large part of their wealth." The price of pepper was very high then, owing to the large tax imposed on it in its passage through Egypt. The demand for this spice and its costliness were the main inducements to the Portuguese to seek for a sea-passage to India, after the discovery of which the trade passed into the hands of the Portuguese from the hands of the Venetians and Genoese. Under the Portuguese, the cultivation spread in the Malay Archipelago, and Malacca became the great emporium for pepper. Subsequently, the Dutch got control of the Malay Islands and attempted to control the trade and its cultivation.

When Ceylon came under Dutch rule, some attention was paid to pepper cultivation and trade. When the island passed into the hands of the English, the cultivation declined.

The Chinese have done a good deal of pepper cultivation, but they afterwards neglected it, on account of the fall in price of pepper.

Pepper is grown in Sumatra, Java, Siam, Penang, Bencoolen, and other places. It is also grown in East Africa, particularly in Zanzibar.

Climate.—Pepper is strictly a tropical plant, and seems to have been cultivated only between 20 degrees north and 20 degrees south. It requires a heavy rainfall, and though a dry season of a few months' duration does not appear to injure it, a very prolonged dry period or too much exposure to sun certainly affects it adversely. In Malabar it is found growing from sea-level up to an altitude of well over 3,000 feet. With an average annual rainfall of about 140 inches, the West Coast offers an ideal place for pepper. A rainfall of less than 100 inches may be considered insufficient for the crop.

Soil.—The original home of pepper is the jungle where the wild variety is still largely found.

Naturally well-drained, red laterite, virgin soil with plenty of humus appears to be the best for pepper cultivation. Pepper is also found to grow well in alluvial soils which are not subject to floods.

The pepper growing regions on the West Coast may be roughly divided into four.—

1. The coast where pepper is grown in every homestead on a small scale.
2. The low hills (between the coast and the foot of the ghats), where pepper is extensively cultivated on slopes and in valleys.
3. The foot of the ghats, where pepper is the heaviest and the best.
4. Wynaad, or above ghats, where also pepper is extensively grown; but here, the produce is neither so heavy nor so good as in the other three divisions.

Generally, flat grounds are good, but large areas of flat ground are seldom available on the West Coast. All kinds of slopes or valleys can be utilized for growing pepper; but, the side facing south must be avoided, for, it is here that the sun is most severe during the hot part of the year. Conversely, the slope facing north is considered the best.

Varieties.—Pepper is still seen in its wild state on the Western Ghats. In the wild state, the plants are dioecious, i.e., some plants have only female flowers, and others only male flowers. Only the former produce fruits, but both the male and female organs are found in the same flowers in most of the cultivated varieties.

The four main cultivated varieties of pepper are (1) Kalluvelli, (2) Balankotta, (3) Cheriakoti, and (4) Uthirankotta. Of these, Nos. 1 to 3 are hermaphrodite, while No. 4 is unisexual.

1. Kalluvelli is a very hardy variety, least susceptible to seasonal vagaries and most suitable to exposed localities. The colour of the runners, leaves, and spikes is very dark green. Flowering branches are stiff, and internodes short. The leaves of Kalluvelli are sized more uniformly and veined more prominently than those of Balankotta. Spikes are shorter and berries set closer than in Balankotta.

2. Balankotta is a fairly heavy and regular bearer, suitable to naturally shaded localities. It possesses the advantage of flushing all over at the same time, so that the crop can be harvested at one time. Leaves are broad and coloured light green and are of a drooping habit. Its spike is the longest, often about six inches in length. Berries are small and packed loosely in the spike; they are lighter, bulk for bulk than those of Kalluvelli.

3. Cheriakoti is a dwarf and sturdy variety with narrow, dark green leaves which are arranged uniformly one above the other. The spikes are short, and berries the smallest in size.

4. Uthirankotta is a very inferior variety, found often mixed up with other cultivated varieties. Being only a poor bearer having pistillate flowers only, it is not generally cultivated. Being strong and rigid, the runners tend to stand perpendicular to the standard. It flowers early and sheds its berries earlier. In certain years, it does not flower at all.

The study of the three varieties Kalluvelli, Balankotta, and Uthirankotta has shown that Kalluvelli is the best yielder. The annual average yield per vine at the Taliparamba Government Experimental Station for the past sixteen years, after the commencement of regular bearing, is given in the following table. The vines were planted at the same time and given the same treatment, though the land had been cropped previously.

Year	Uthirankotta, Plot No 74		Balankotta, Plot No 73		Kalluvelli, Plot No 75	
	Number of vines	Yield per vine in m.m	Number of vines	Yield per vine in m.m	Number of vines	Yield per vine in m.m
1913 ..	10	020	50	265	33	380
1914	42	115	93	390	58	400
1915	23	023	74	074	61	200
1916 ...	28	080	70	243	69	340
1917	52	005	86	230	72	316
1918 . ..	52	101	88	258	88	837
1919	56	183	95	674	108	1'111
1920 .	67	063	103	405	84	1'048
1921	66	152	103	230	84	863
1922 ...		Bad season—Yield negligible				
1923 .	74	432	103	447	76	1 066
1924 .	63	075	86	131	118	574
1925 .	38	230	114	252	102	809
1926 .	54	505	69	721	98	1 230
1927 ..	89	306	99	503	125	964
1928 ...	89	008	99	172	125	348

There are other sub-varieties, such as Kallubalankotta and Karin-kotta. The former, as its name indicates, is a stage intermediate between Kalluvelli and Balankotta, probably the result of a natural

cross. Karinkotta is similar to Kalluvelli, and is most commonly found in Calicut and other parts of South Malabar. Wynaad Balankotta is exactly like the Balankotta of the plains, but on account of the more virgin and fertile soil of Wynaad, the former gives a higher yield than the latter. Wynaad Kalluvelli seems to be a different type altogether, with its stiff, dark-coloured and rounded leaves having prominent veins. Spikes are short and berries small. It is a poor and irregular yielder, not worthy of being propagated at all.

Preparation and planting of standards.—In the case of pepper cultivation, a standard has to be provided for the vine to climb upon. It has to be noted that pepper has two kinds of roots, (1) regular feeding roots, and (2) adventitious, or aerial roots, the former being below ground and the latter above ground. It is the latter which adhere to the standard, keeping the vine in position.

Being a delicate climber, pepper requires a certain amount of shade at the early stages. Too much exposure to sun has often been found ruinous to the young plantations. But when the vines come to the bearing stage, too much topshade reduces flowering and consequently the yield. If sun-rays are not sufficiently admitted to the plantations, the formation of berries is proportionately reduced. So the regulation of shade to pepper plantations is of prime importance.

In the selection of standards the conditions to be carefully observed are the following.—

1. They must be quick-growing.
2. They must have permanently rough bark.
3. They must stand heavy pruning.
4. They must have deep roots, preying very little upon the surface soil-contents.
5. They may, preferably, be of a leguminous species, serving to keep up or add to the fertility of the soil.

When a new site is being cleared for pepper, trees satisfying the above conditions should be left undisturbed, while the others should be uprooted.

The following is a list of good standards :—

1. Murukku, *Erithrina indica*.
2. Thekkankarayam, *Garuga pinnata*.
3. Ambayam, *Spondius mangifer*.
4. Mango, *Mangifera indica*.
5. Nux-vomica, *Strychnos nux-vomica*.
6. Alam, *Caria arborea*.
7. Wattukarayam, *Odina woder*.

Murukku is the most common standard.

Preparation of Murukku standards.—In virgin soils, cleared of shrubs and trees, there is the practice of cultivating Punam (hill) paddy. To raise Murukku, its seed is also sown along with Punam. When, in about 4 to 5 months, the hill paddy is harvested, the Murukku seedlings are not disturbed, but allowed to grow up. When they have attained a height of about 5 or 6 feet, they are cut and stacked in shade; this work is done generally in February-March. They are planted out in May, generally during Karuthavavu (New moon) days, when, it is supposed, that the number of insects doing harm is less or nil. The planting is done by putting the bottom ends of the standards 1 to 1½ feet deep into the soil, according to their height, the distance between

standards varying from 8 to 12 feet, according to the fertility of the soil. In very rich soils, the minimum distance may be 12 feet

About the middle of June, when the rains would have set in, the vine cuttings are also planted close to the standards.

Unlike other standards, Murukku standard does not live long. It is often found that it dies within 20 to 25 years, when the attached vine would probably be in a flourishing condition. The separation of the standard is often too hard for the widowed vine to bear lightly. To save the vine from this catastrophe, wild mango seeds are sown, two or three years after planting the vine. When they have grown up well, they are substituted for Murukku.

In some places, like China and Singapore, pepper is trained on to dead standards. The use of dead standards does away with the possibility, in the case of live ones, of the soil being depleted of its manurial ingredients. At Taliparamba Government Experimental Station a trial was made with dead Irul as standard, but without success, as it did not last for more than five years due to climatic conditions and insect attack.

Preparation and planting of cuttings.—Pepper is propagated vegetatively by means of cuttings. At Taliparamba Experimental Station it was found that propagation by seed is a very slow process, that the percentage of germination is small, and that even the small percentage germinated takes a very long time to grow up or bear fruit. In pepper estates, self-sown seedlings can be picked up. They are, generally, of the Uthrankotta variety.

As regards cuttings, it is of extreme importance that they should be taken from good, healthy, young vines. Under ordinary conditions the vines are in their best state from 8 to 20 years after planting. Hence, this is the most suitable period for taking cuttings. But is not uncommon for top cuttings to be taken from still younger vines.

Cuttings are generally taken from runners of the previous season, coming out from the base of the vine. For this, the runners are allowed to coil as they grow out of the vine, around forked pegs introduced into the soil, near the base of the vine. Vines should be carefully selected at the time of bearing for the preparation of cuttings.

Each cutting must have five or six nodes, and five or six such cuttings are planted close to each standard, with two or three nodes of each cutting below ground, and slightly covered up with some dry stuff. It is advisable to have the cuttings planted to the north of the standards, so that the latter might serve, as stated before, to protect them from heat during summer.

Being of a delicate nature, the pepper cuttings are apt to rot with excessive rain and to dry up with severe heat. Blanks thus caused in new plantations must be gradually filled up in order to ensure a uniform stand of the crop.

It was believed, and is still sometimes believed, that Thiruvathira Jnathuvela, a cycle of fourteen days, coming in June-July, is the most suitable and auspicious time for planting pepper, but nowadays the vagaries of the monsoon have become so increasingly persistent as not to give room to such beliefs. It is narrated that when a Zamorin of Calicut took his Minister, one Mangat Achan, to task for having sold ship-loads of vine-cuttings to the Portuguese, his reply was that he parted with the vine-cuttings only and not the Jnathuvela, meaning

thereby that Jnathuvela, the season when pepper is usually planted, is more important than the vine-cuttings and that the former would not be taken out of Malabar by the Portuguese,

After-cultivation and Treatment.—At the beginning of the monsoon, after planting the vines, a deep and thorough digging must be given. Towards the fag-end of the north-east monsoon a light digging and levelling should also be done. The object of the digging at the beginning of the monsoon is to destroy weeds, to minimise surface wash, and to make rain-water pass through, so that the manurial ingredients may be washed down into the soil instead of being washed away. The object of the digging at the end of the monsoon is to destroy the remaining weeds and to keep the surface soil loose with a view to conserve the soil moisture.

In the West Coast districts soil denudation is a serious problem. On account of the heavy rainfall, amounting to 150 inches annually, even fairly level lands are subjected to wash. The wash is perceptible even in uncultivated lands. The result is that the land is everywhere becoming poorer in fertility.

When the land is sloping and regularly cultivated the loss on account of surface wash becomes heavy. The aim of the farmer should be to reduce the surface wash to a minimum by constructing suitable bunds, or terraces, or by cultivating cover or catch crops. The latter aspect will be dealt with later.

The pepper estate should be well terraced within two or three years after planting. The greater the gradient, the narrower the terraces should be. It is advisable to have each row of vines located on a separate terrace. The edge of the terrace may be raised by one or two feet to form bunds.

Tying of vines.—As the runners grow up and branch out they must be carefully tied on to the standard. Adventitious roots will then keep the vines up. If these runners are allowed to straggle on the ground they take root in the soil and get spoiled. The fibre which is commonly used for tying is made out of the outer bark of a plant called Cowla (*Electris isora*) which grows wild in the jungles.

Regulation of shade.—This is an important item to be carefully attended to in pepper cultivation. Too much exposure of the young vines to the sun's heat is found to be dangerous and sometimes even ruinous. If, on the other hand, the vines are not sufficiently exposed, the flowering is found to be badly affected, with the result that berries are not properly formed. Therefore, the vines should neither be too much nor too little exposed. In the month of May, the branches of the standards must be lopped off for the purpose of letting in and exposing the vines to the sun. Being soft-stemmed, murukku, if lopped in the rainy season, would suffer, so shade has to be very carefully regulated.

A further precaution to protect the vines from sun can be taken in January-February by having Irul (*Xylia dolabriformis*) twigs with leaves kept round the vines, tied to the standard. The leaves which remain persistent after the twigs are dried up are removed with the first showers to prevent white-ant attack.

Lowering.—Vines are sometimes lowered with the object of making them stout and thick instead of tall and thin. It is found that, even after a couple of years, some vines shoot up straight without sending out side branches. In such cases it is a good practice to remove the

runners from the standard and coil them round in a circular pit made at the base of the standard, leaving only a foot height of the runners above ground. It would be well, if the leaves from the portion of the runners that go inside the ground, were removed. By this method, a good root system is established and consequently, a large number of lateral branches are thrown out. Although the lowering would cause a temporary set-back to the condition of the vines, this would be made up by the quicker growth in the subsequent years. This operation should be done at the time of digging in June-July.

Mounding—Mounding which consists in putting fine soil round the vines little by little, year after year, is a good practice, especially in localities where the sub-soil is rocky and the land is otherwise ill-drained. This practice ensures the establishment of a good root system which suffers least in the hot weather.

Manuring.—Pepper cultivation is generally started on virgin hill slopes which have not been brought under the plough before, therefore if the surface wash is stopped soon after pepper is planted, the necessity for manuring is very seldom felt.

The old practice is to reject a plantation, after 25 or 30 years when the yield does not turn out to be remunerative. Now that the population has increased and with it the cultivation of hill-paddy, by the wasteful and destructive method of cutting and burning the jungle the area available for pepper cultivation has been manured and the time has come for the cultivator to seriously consider the question of manuring pepper.

Availability of soil moisture is of prime importance to a delicate plant like pepper, and the presence of moisture is closely related to the presence of organic matter or humus in the soil. The most suitable and natural manure for pepper is humus. The application of humus in the form of leaf-mould to pepper received the early attention of the Agricultural Department at the Taliparamba Government Experiment Station. About 20 lb. of this material was applied per vine with good results.

The following manurial trials were made at Taliparamba Station :—

- (i) Fish-guano at $\frac{1}{4}$ lb per vine.
- (ii) Lime $\frac{1}{2}$ m.m. of lime *plus* 1 basket leaf-mould (20 lb.) per vine.
- (iii) Fish-guano $\frac{1}{4}$ lb. or $\frac{1}{2}$ m.m. of lime *plus* 1 basket leaf-mould in alternate years.
- (iv) Leaf-mould 1 basket (20 lb.) per vine.
- (v) Green-leaf mulching after the north-east monsoon

Though, due to variations in the nature of the plots chosen, the kind of pepper grown and the season prevailing, no really definite conclusions can be drawn, it has been proved beyond doubt that the following manures are very good for pepper. Fish-guano $\frac{1}{4}$ lb. to 1 lb.; lime 1 lb *plus* 20 lb of leaf-mould; and also fish-guano $\frac{1}{4}$ lb. *plus* lime $\frac{1}{2}$ lb. *plus* leaf-mould 20 lb. The mulching of the whole plot with green leaves has done immense good to the vines and kept them in excellent condition.

Cattle manure and ashes were also tried for pepper and in half a dozen years the trial gave satisfactory results; but, later on, the vines began to decline in condition losing their attachment to the standards.

In the plots manured with cattle manure, the murukku standards began to decay much quicker and earlier.

Though the plot to which ashes alone were applied gave an increased outturn for some years, it began to decline afterwards for want of nitrogenous and phosphatic manures.

Twenty years' experience at Taliparamba Experimental Station has shown that even old vines, aged 40 to 50 years, can be made to pay, if proper attention is paid to the annual digging of plots, tying of vines, and regulation of shade, as well as to the manuring of the plots.

In Wynaad and South Coorg pepper is grown extensively in coffee estates. Here, the heavy manuring given to the coffee benefits the pepper vines also, which consequently yield heavily.

PREPARATION OF LEAF-MOULD

As indicated already, leaf-mould is an important manure for pepper. In places where leaves are available the preparation of leaf-mould is an easy matter. In the rainy season pits are dug and filled with leaves, and kept open for water to soak in. In the hot weather the pits are covered up. Leaf-mould will then be ready for use in the next season.

The manure should be applied in June-July when there is plenty of moisture in the soil. The surface soil is carefully removed to 4 or 5 inches depth, before the manure is applied. After the application, the soil removed is put back. As the roots of pepper are delicate, careless application of the manure might do harm to the crop. When there is no moisture in the soil, no digging should be attempted.

The growing of some green manure or catch crop between the pepper standards is recommended. With falling crops and falling prices it is only reasonable to expect the unused land between the standards to bear its share of the expenses. Previously, coffee used to be grown as a catch crop. The green-manure crops tried in the old pepper plots at the Taliparamba Experimental Station are Cow-gram, Horse-gram, Kolinji, Dhaincha, and *Tephrosia candida*; but, due to shade in the plots, it was found difficult to get anything like a good return. In newly planted gardens, where there is plenty of light, *Tephrosia candida* comes up very well.

ECONOMIC ASPECT.

In good fertile lands pepper vines begin to flower in the third year. Until 5 or 6 years after planting, regular or uniform bearing does not commence. It is difficult to say at what age the vines yield best. From the 10th up to the 20th or 25th year the vines give the highest yield. Afterwards they begin to decline, then it is the general practice in the West Coast to neglect the vines. But, experience at Taliparamba Station shows that a garden can be made to give profitable returns up to 50 or even 60 years, if proper attention is paid to cultivation as well as manuring.

It would cost about 150 rupees to bring up an acre of pepper garden from the planting to the bearing stage. The annual recurring expenditure is comparatively little.

In a good year 5 to 12 lb. of dry pepper per vine is not an uncommon yield. In Wynaad, and sometimes even in the plains, the writer has observed that a vine is capable of yielding about 30 m.m. of green pepper annually. An acre of average, middle-aged garden should easily yield about 500 m.m. of green, i.e., about 300 lb. of dry pepper worth—according to market fluctuations which are sometimes violent—anything from Rs. 200 to Rs. 500. The price of green pepper has been

found to vary from annas four to rupee one per m m Pepper has been aptly described as the money of Malabar.

Vines flush in April-May, flower in May-June, and come to harvest in December-February. When pepper is ripe for harvest, the berries change colour from green to red or reddish brown. The harvest must be begun and finished at the proper, ripe stage. If it is delayed, berries are shed and vines get weakened; if it is done earlier, the yield is found to be inferior in quality and there is loss in weight also. The harvest of pepper is done by nipping the spikes off, accomplished by a cooly mounted on a ladder kept resting in position on the standard. The spikes are thrashed by treading; and after thrashing and clearing the spikes, the berries are dried in well-prepared yards or on mats. Some attention has to be paid to the uniform and even spreading of the berries at the time of drying them, as otherwise loss of weight due to rotting of the berries might result.

Pollination.—The influence of season on the yield of pepper is unique. Pepper is easily susceptible to, and much affected by, seasonal vagaries. Heavy, continuous rain is found to badly affect pollination; so also is a prolonged dry period of sunshine. Showery weather with intervals of sunshine seems to be the ideal condition for effective pollination. It is believed that pepper bears well only once every alternate year and that it sometimes takes three or four years to recover from the effects of overbearing.

Uses of pepper.—Pepper is used for medicinal and culinary purposes. The use of pepper as a spice or condiment dates from very early times.

Its strong pungency and stimulating action made it very much in demand.

White pepper is obtained from the same plant as the black, and differs only in being prepared from the ripe fruits. These, after collection, are kept heaped for three or four days, so that the outer skin might become pulpy. They are then brushed and washed in a basket with the hand until the stalks and pulpy matter are removed, after which the seeds are dried in the sun for four or five days. White pepper, thus prepared is bleached by commercial firms before they export it. White pepper is, however, sometimes prepared from the dried black pepper by removing the dark outer layer. Tellicherry was once noted for very fine white pepper.

Pests and Diseases.—As regards the pests and diseases of pepper, it is sometimes subject to the attack of a flat, thin, and papery scale with a pale yellow central spot; but, by far the most serious disease that attacks the vines is the "Wilt" disease. When there is an attack of the Wilt disease, the leaves turn yellow and are subsequently shed, the vine withers, and the standard remains lightly festooned with relaxed stalks bearing a few dried leaves.

Mr. R. D. Anstead and Mr. Macrae are agreed that the disease is caused by a fungus which enters the roots, gaining entrance through wounds produced by forking and other means. The following preventive measures for combating the disease were recommended by Mr. Anstead after consultation with Mr. Macrae.—

1. Cuttings for new vines should always be chosen from vines which have remained persistently healthy in the midst of a diseased field, if such can be found.

2. Pepper plantations should be well drained by a system of drains, eight inches deep, so as to keep the bases of the vines free from stagnant water.

3. Every vine, healthy and diseased, should be sprayed at least once a year with Bordeaux mixture.

4. As soon as ever a vine begins to show signs of the disease, the area covered by the roots should be given an application of slaked lime at the rate of 4 lb. per vine, broad casted on the surface, and a trench should be dug around it to a depth of two feet, the soil taken from the trench being thrown inside to cover the lime.

5. If forking is done at all, it should be done very lightly so as not to wound the roots and form points of entry for the fungus spores. At all times the vines should be kept heavily mulched.

6. Fields should be kept clean; all diseased and dead plants should be cleared and burned.

The application of lime and leaf-mould, and trenches dug three feet round coupled with the pruning of vines three feet above ground, has saved the pepper crop from wilt attack at the Taliparamba Agricultural Station.

A serious disease of pepper on the West Coast is "Pollu," caused by the attack of a small beetle, which lays its eggs inside the berries. The grub which emerges from the egg, slowly eats into the berries and makes them Pollu (literally hollow). Investigations on Pollu disease are being carried out at Taliparamba Experiment Station. Observations have shown that spraying with Bordeaux mixture alone is effective to a certain extent to keep off Pollu.

Other minor pests of pepper are the mealy bugs and the white ant. The attack of mealy bugs appeared greater on pepper vines which were sprayed with Bordeaux mixture at Taliparamba. White-ant attack is noticeable more on young than on old vines.

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